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Does neighborhood walkability moderate the effects of mass media communication strategies to promote regular physical activity?

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Centre for the Built Environment and Health

Centre Funded by:



Australian Government

National Health and Medical Research Council

Land Development Agency Sponsor:



Background



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- *Find Thirty every day*[®] (funded by DoH, delivered by Heart Foundation, Western Australia) began in 2008
- Built on Find Thirty. It's not a big exercise (2002-2005)
- Rationale:
 - 27.8% adults insufficiently active
 - 11.7% completely inactive
 - Mass media – potential to reach large populations
- What about the built environment?
 - Walkability of neighborhoods influences walking behaviors



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Aim and Objectives of Find Thirty every day[®]



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Aim: To increase the number of Western Australians sufficiently active for good health

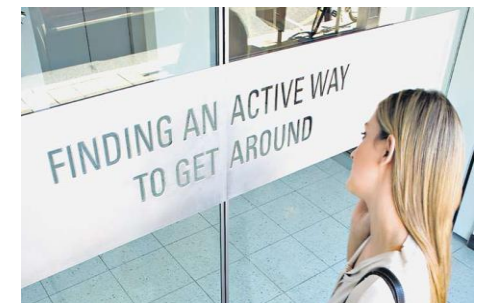
Objectives:

1. To increase awareness – type and frequency of physical activity required for good health
2. To increase awareness – specific benefits of physical activity (physical, mental, social)
3. To demonstrate how people overcome perceived barriers to participation in physical activity
4. To congratulate those already active

Target group: Adults 25-54 years

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Mass media advertisements – TV, radio, billboards, website



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Study Aim and Hypothesis



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Aim:

To compare pre- and post-campaign cognitive and behavioral impacts, of the National Heart Foundation's *Find Thirty every day*[®] campaign, in respondents living in high and lower walkable areas.

Hypothesis:

Cognitive and behavioral impacts will increase post-campaign, but the effect sizes will be larger in respondents living in high vs. lower, walkable neighborhoods.



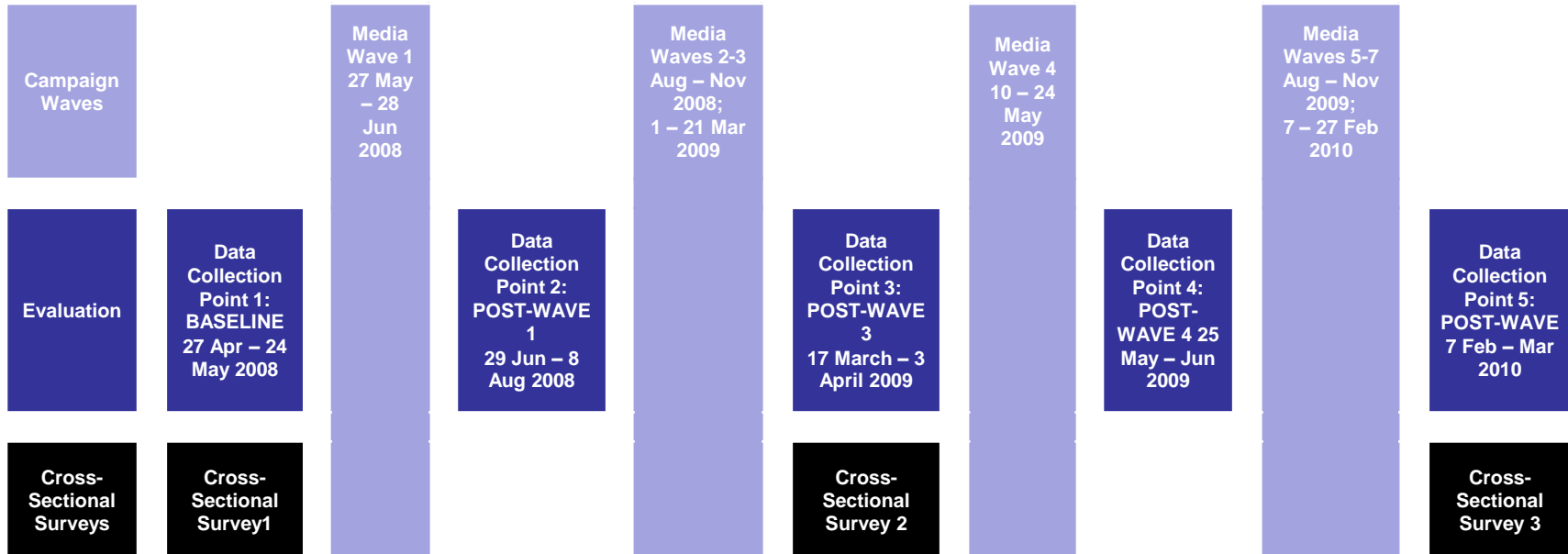
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Methods – Evaluation Design



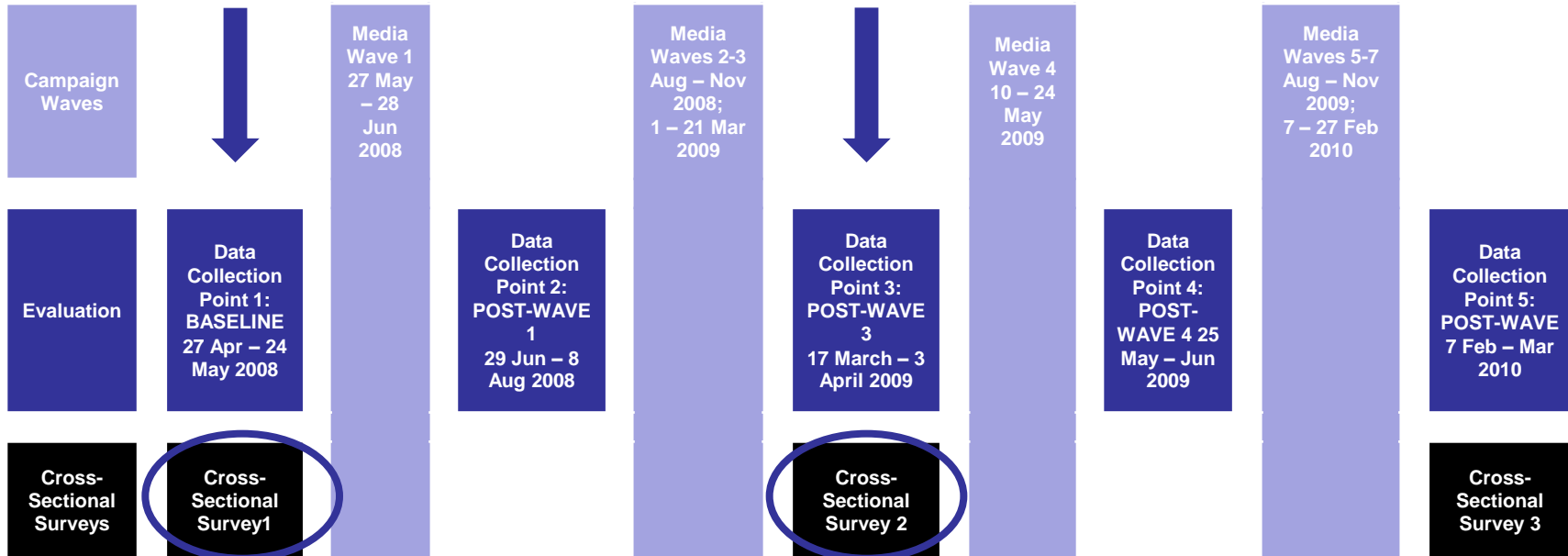
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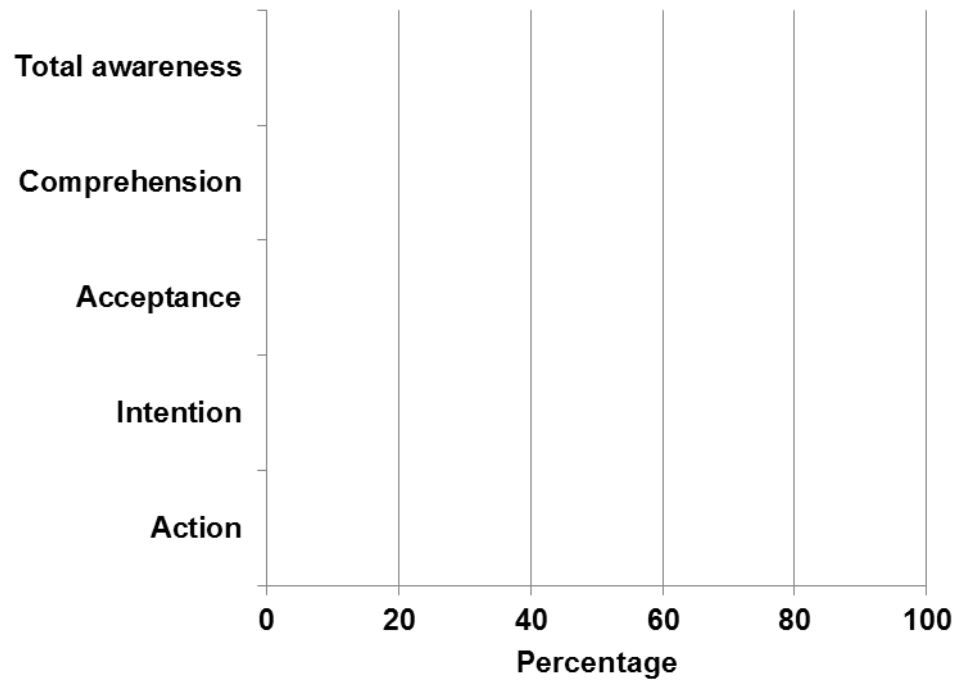
Methods – Evaluation Design



Methods – Cognitive Measures



McGuire's Hierarchy of Effects Model

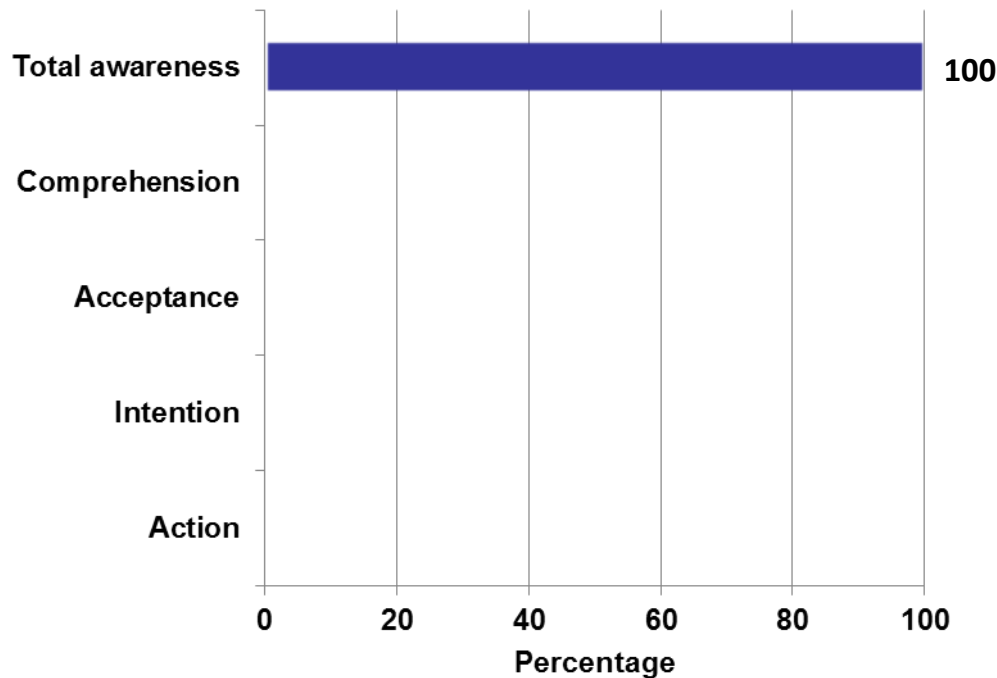


Methods – Cognitive Measures



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McGuire's Hierarchy of Effects Model



If 'Yes' to: "In the last three months, do you remember seeing any TV ads about physical activity or exercise"

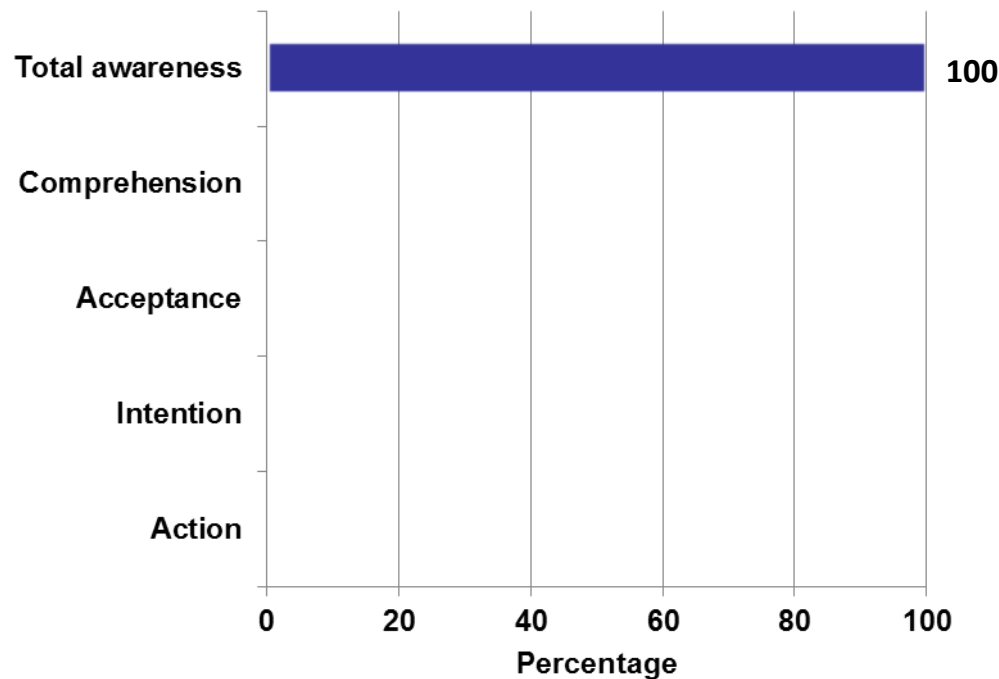
"Can you please describe the ads you saw?"

Methods – Cognitive Measures



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McGuire's Hierarchy of Effects Model



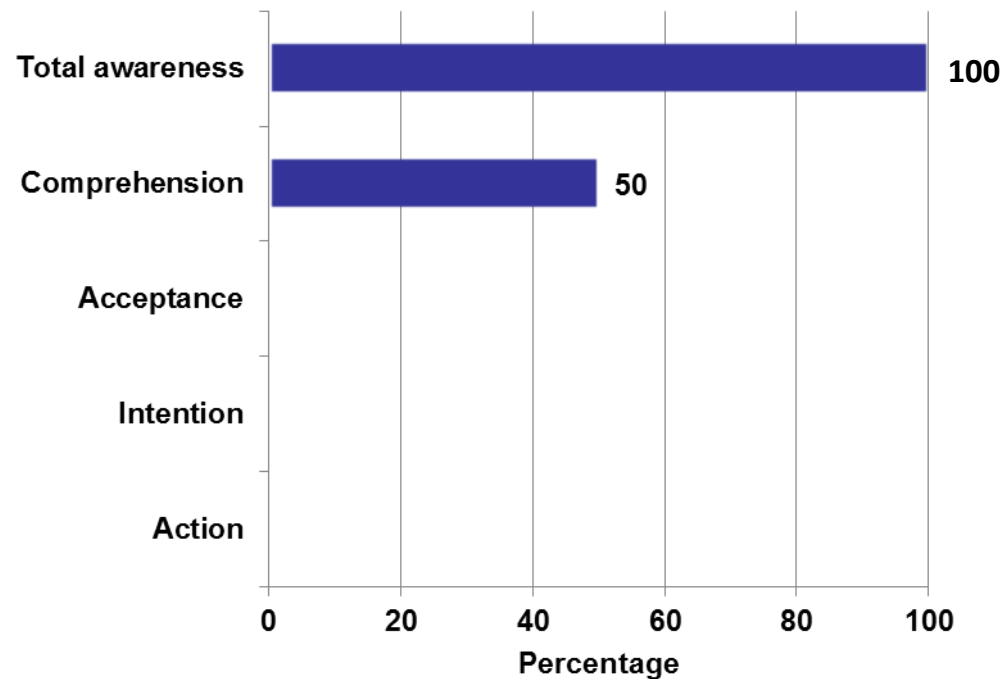
Or “Have you seen any of the following TV ads? Firstly...

Methods – Cognitive Measures



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McGuire's Hierarchy of Effects Model



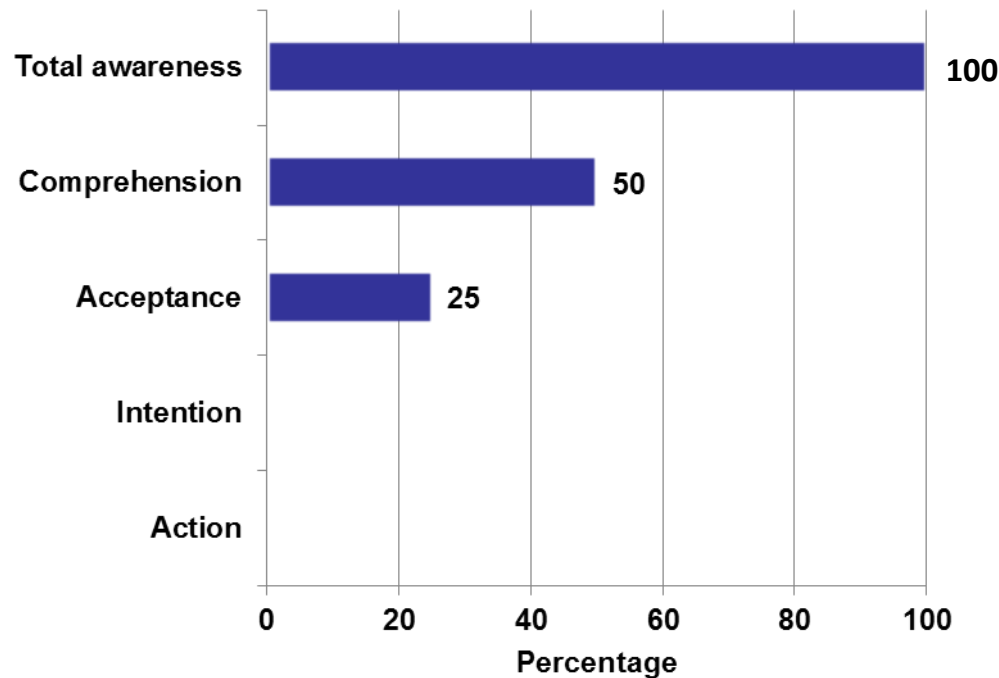
“What do you think is the main message of these TV ads? What is it actually saying?”

Methods – Cognitive Measures



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McGuire's Hierarchy of Effects Model



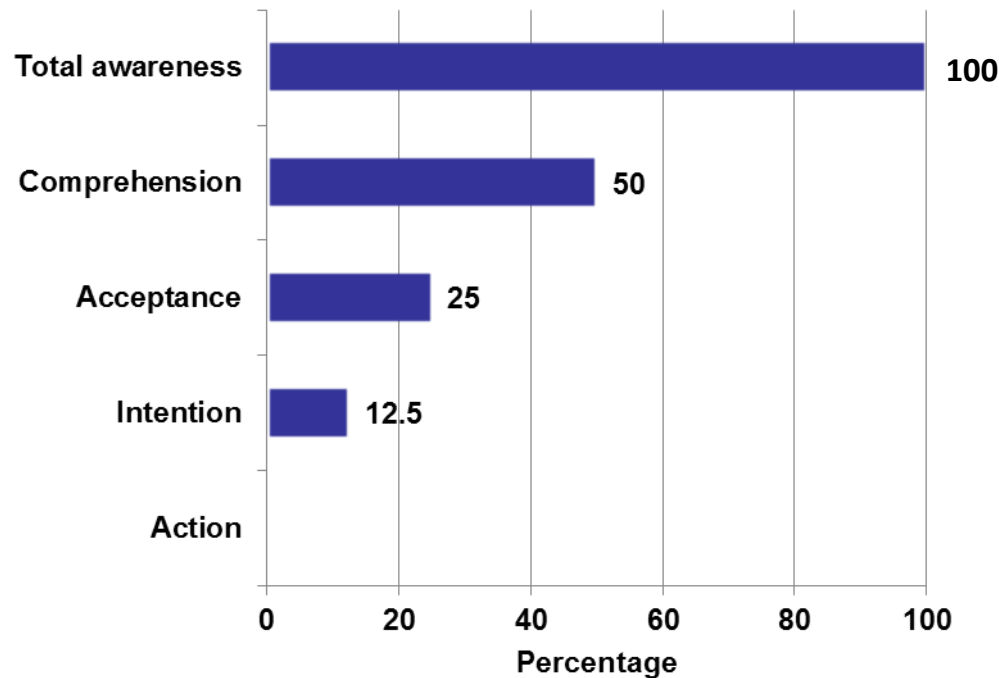
“How acceptable did you find what was being put across in these ads?”

Would you say...Very acceptable, Somewhat acceptable or Not at all acceptable?”

Methods – Cognitive Measures



McGuire's Hierarchy of Effects Model



If 'Yes' to "As a result of seeing or hearing the campaign did you think about doing anything related to the message?"

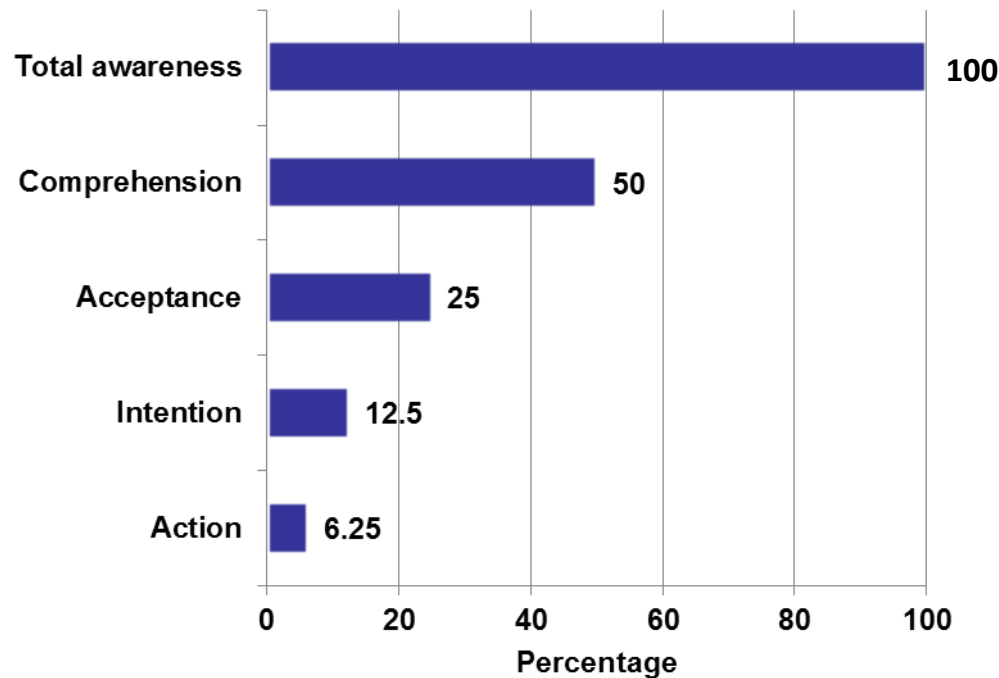
"What did you think about doing?"

Methods – Cognitive Measures



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McGuire's Hierarchy of Effects Model



If 'Yes' to "As a result of seeing or hearing the campaign did you do anything, anything at all, related to the message?"

"What did you do?"

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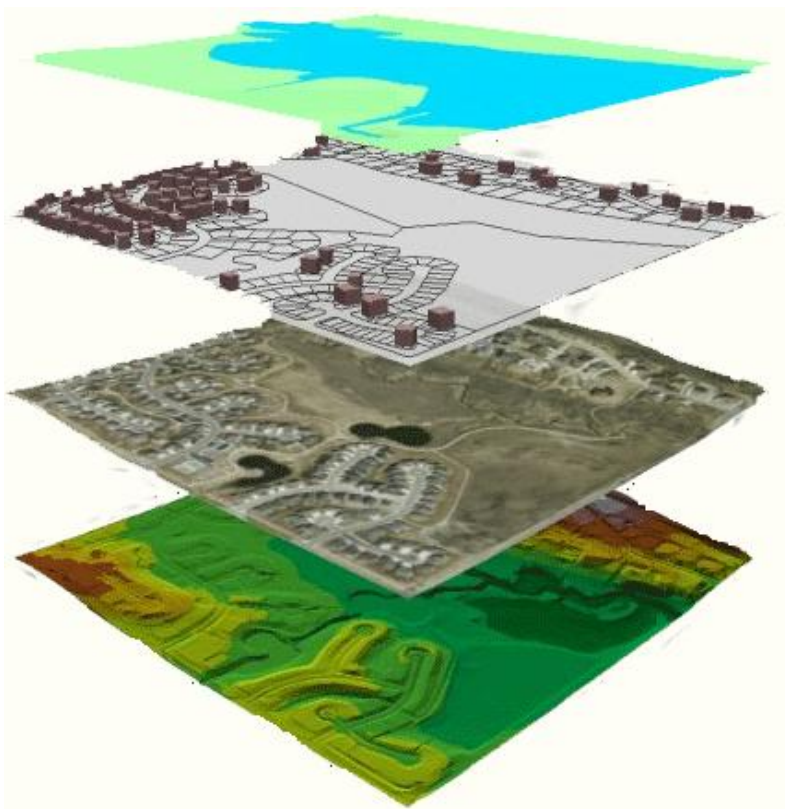


- Any transport walking, overall walking, total PA (Yes/No)
- Sufficient (Yes/No)
 - Transport walking (≥ 150 minutes)
 - Overall walking (≥ 150 minutes)
 - Total PA (≥ 150 minutes and ≥ 5 sessions)
- *Active Australia* measures
 - Frequency/duration, last seven days

Methods – GIS Walkability Measures



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- Two measures within 1600meter road network buffer
- **Transport walkability:** Dwelling density, connectivity and land use mix¹
- **Recreational walkability:** Dwelling density, connectivity and land use mix including recreational space²

¹Frank, L. D., Schmid, T. L., Sallis, J. F., Chapman, J. & Saelens, B. E. 2005. Linking objectively measured physical activity with objectively measured urban form: Findings from SMARTRAQ. *American Journal of Preventive Medicine*, vol. 28, no. 2, Supplement 2, pp. 117-125.

²Christian, H., Bull, F. C., Middleton, N. J., Knuiman, M. W., Divitini, M. L., Hooper, P., Amarasinghe, A. & Giles-Corti, B. 2011. How important is the land use mix measure in understanding walking behaviour? Results from the RESIDE study. *International Journal of Behavioral Nutrition and Physical Activity*, vol. 8, no. 55, pp. 1-12.

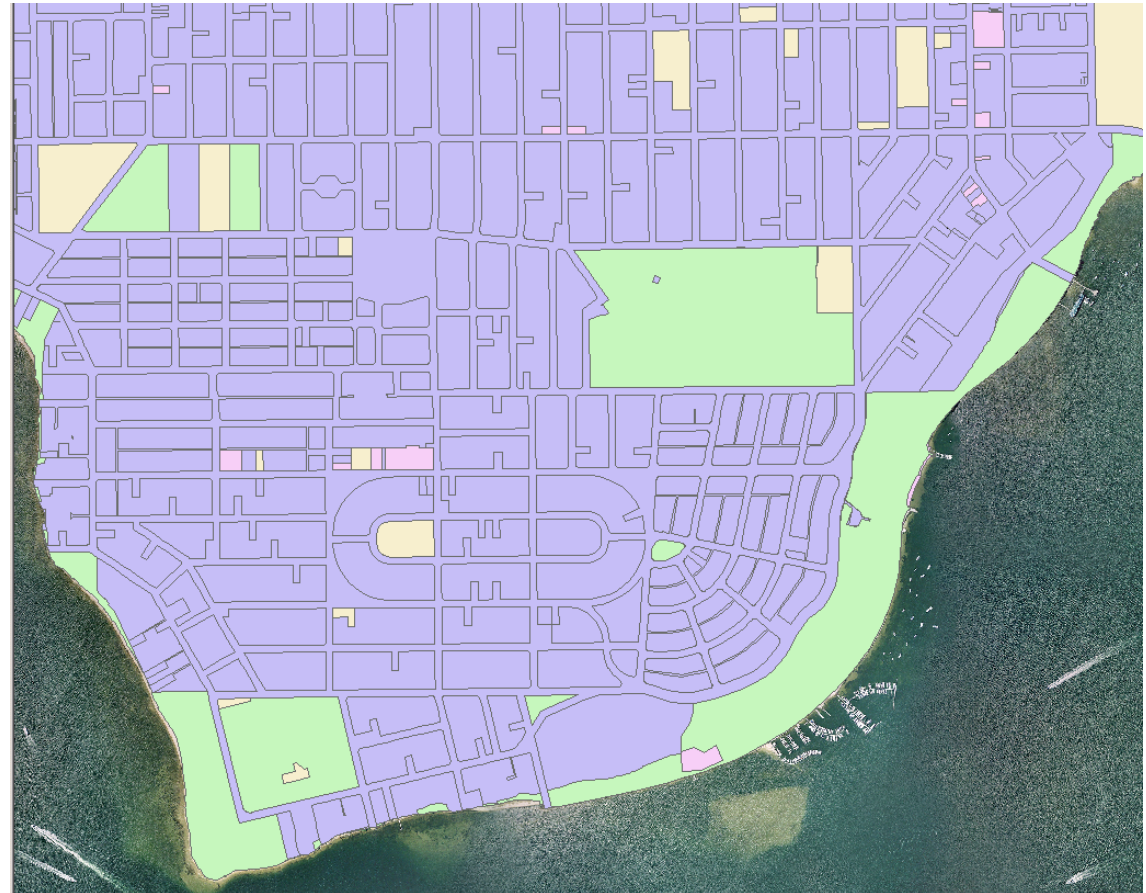
Methods – Land Use Mix Variable



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Transport index land uses:

- Retail
- Offices
- Health / welfare /community
- Entertainment / culture / recreation
- Primary land uses
- Residential



Christian, H., Bull, F. C., Middleton, N. J., Knuiman, M. W., Divitini, M. L., Hooper, P., Amarasinghe, A. & Giles-Corti, B. 2011. How important is the land use mix measure in understanding walking behaviour? Results from the RESIDE study. *International Journal of Behavioral Nutrition and Physical Activity*, vol. 8, no. 55, pp. 1-12.

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Methods – Land Use Mix Variable



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Recreational index land uses:

- Retail
- Offices
- Health / welfare /community
- Entertainment / culture / recreation
- Primary land uses
- Residential
- Public open space
- Sporting infrastructure



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Results - Demographic Characteristics



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	Lower walkable		<i>p</i>	High walkable		<i>p</i>
	Pre n=363 %	Post n=278 %		Pre n=121 %	Post n=92 %	
Gender						
Male	48.5	50.7	0.575	57.0	50.0	0.308
Age group						
35 years and over	74.3	78.4	0.177	72.8	78.2	0.184
Education						
University	31.1	34.9	0.511	45.5	42.4	0.728
Socio-economic status (area level)						
Low	19.1	16.9	0.213	14.0	14.1	0.742
Household income						
Less than \$50,000	22.6	12.9	0.005	23.1	17.4	0.780

Results – Cognitive and Behavioral Impacts



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	Lower walkable			High walkable		
	Pre	Post		Pre	Post	
	n=363	n=278		n=121	n=92	
	%	%	<i>p</i>	%	%	<i>p</i>

Cognitive

Results – Cognitive and Behavioral Impacts



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	Lower walkable		<i>p</i>	High walkable		<i>p</i>
	Pre n=363 %	Post n=278 %		Pre n=121 %	Post n=92 %	
Cognitive						
Awareness	34.4	50.4	<0.001	27.3	51.1	<0.001

Results – Cognitive and Behavioral Impacts



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	Lower walkable		<i>p</i>	High walkable		<i>p</i>
	Pre n=363 %	Post n=278 %		Pre n=121 %	Post n=92 %	
Cognitive						
Awareness	34.4	50.4	<0.001	27.3	51.1	<0.001
Comprehension	25.9	41.4	<0.001	18.2	43.5	<0.001

Results – Cognitive and Behavioral Impacts



	Lower walkable		<i>p</i>	High walkable		<i>p</i>
	Pre n=363 %	Post n=278 %		Pre n=121 %	Post n=92 %	
Cognitive						
Awareness	34.4	50.4	<0.001	27.3	51.1	<0.001
Comprehension	25.9	41.4	<0.001	18.2	43.5	<0.001
Acceptance	25.3	40.6	<0.001	18.2	41.3	<0.001

Results – Cognitive and Behavioral Impacts



	Lower walkable		<i>p</i>	High walkable		<i>p</i>
	Pre n=363 %	Post n=278 %		Pre n=121 %	Post n=92 %	
Cognitive						
Awareness	34.4	50.4	<0.001	27.3	51.1	<0.001
Comprehension	25.9	41.4	<0.001	18.2	43.5	<0.001
Acceptance	25.3	40.6	<0.001	18.2	41.3	<0.001
Intention	12.9	23.4	0.001	7.4	18.5	0.015

Results – Cognitive and Behavioral Impacts



	Lower walkable		<i>p</i>	High walkable		<i>p</i>
	Pre n=363 %	Post n=278 %		Pre n=121 %	Post n=92 %	
Cognitive						
Awareness	34.4	50.4	<0.001	27.3	51.1	<0.001
Comprehension	25.9	41.4	<0.001	18.2	43.5	<0.001
Acceptance	25.3	40.6	<0.001	18.2	41.3	<0.001
Intention	12.9	23.4	0.001	7.4	18.5	0.015
Action	5.5	12.2	0.002	4.1	14.1	0.009

Results – Cognitive and Behavioral Impacts



	Lower walkable		<i>p</i>	High walkable		<i>p</i>
	Pre n=363 %	Post n=278 %		Pre n=121 %	Post n=92 %	
Cognitive						
Awareness	34.4	50.4	<0.001	27.3	51.1	<0.001
Comprehension	25.9	41.4	<0.001	18.2	43.5	<0.001
Acceptance	25.3	40.6	<0.001	18.2	41.3	<0.001
Intention	12.9	23.4	0.001	7.4	18.5	0.015
Action	5.5	12.2	0.002	4.1	14.1	0.009
Behavioral						
Transport walking						
Any	74.6	67.3	0.046	71.2	67.4	0.559
Sufficient	36.6	33.5	0.420	34.7	31.5	0.620

Results – Cognitive and Behavioral Impacts



	Lower walkable		<i>p</i>	High walkable		<i>p</i>
	Pre n=363 %	Post n=278 %		Pre n=121 %	Post n=92 %	
Cognitive						
Awareness	34.4	50.4	<0.001	27.3	51.1	<0.001
Comprehension	25.9	41.4	<0.001	18.2	43.5	<0.001
Acceptance	25.3	40.6	<0.001	18.2	41.3	<0.001
Intention	12.9	23.4	0.001	7.4	18.5	0.015
Action	5.5	12.2	0.002	4.1	14.1	0.009
Behavioral						
Transport walking						
Any	74.6	67.3	0.046	71.2	67.4	0.559
Sufficient	36.6	33.5	0.420	34.7	31.5	0.620
Overall walking						
Any	87.6	84.8	0.310	86.0	84.4	0.760
Sufficient	39.8	43.1	0.396	39.7	50.0	0.135

Results – Cognitive and Behavioral Impacts



	Lower walkable		<i>p</i>	High walkable		<i>p</i>
	Pre n=363 %	Post n=278 %		Pre n=121 %	Post n=92 %	
Cognitive						
Awareness	34.4	50.4	<0.001	27.3	51.1	<0.001
Comprehension	25.9	41.4	<0.001	18.2	43.5	<0.001
Acceptance	25.3	40.6	<0.001	18.2	41.3	<0.001
Intention	12.9	23.4	0.001	7.4	18.5	0.015
Action	5.5	12.2	0.002	4.1	14.1	0.009
Behavioral						
Transport walking						
Any	74.6	67.3	0.046	71.2	67.4	0.559
Sufficient	36.6	33.5	0.420	34.7	31.5	0.620
Overall walking						
Any	87.6	84.8	0.310	86.0	84.4	0.760
Sufficient	39.8	43.1	0.396	39.7	50.0	0.135
Total physical activity						
Any	92.8	91.0	0.396	93.4	89.1	0.268
Sufficient	62.0	69.8	0.040	62.8	71.7	0.171

Results - Cognitive Impact Adjusted Models



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Awareness		Comprehension		Acceptance		Intention		Action	
Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
OR	OR	OR	OR	OR	OR	OR	OR	OR	OR
(95%CI)		(95%CI)		(95%CI)		(95%CI)		(95%CI)	

Walkability

High

Lower

***<0.001

**<0.01

*<0.05

Results - Cognitive Impact Adjusted Models



	Awareness		Comprehension		Acceptance		Intention		Action	
	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)
Walkability										
High	1.00	3.05*** (1.69,5.53)								
Lower										

***<0.001

**<0.01

*<0.05

Results - Cognitive Impact Adjusted Models



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	Awareness		Comprehension		Acceptance		Intention		Action	
	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)
Walkability										
High	1.00	3.05*** (1.69,5.53)	1.00	3.96*** (2.07,7.59)						
Lower										

***<0.001

**<0.01

*<0.05

Results - Cognitive Impact Adjusted Models



	Awareness		Comprehension		Acceptance		Intention		Action	
	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)
Walkability										
High	1.00	3.05*** (1.69,5.53)	1.00	3.96*** (2.07,7.59)	1.00	3.52*** (1.85,6.71)				
Lower										

***<0.001

**<0.01

*<0.05

Results - Cognitive Impact Adjusted Models



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	Awareness		Comprehension		Acceptance		Intention		Action	
	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)
Walkability										
High	1.00	3.05*** (1.69,5.53)	1.00	3.96*** (2.07,7.59)	1.00	3.52*** (1.85,6.71)	1.00	2.79*** (1.17,6.67)		
Lower										

***<0.001

**<0.01

*<0.05

Results - Cognitive Impact Adjusted Models



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	Awareness		Comprehension		Acceptance		Intention		Action	
	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)
Walkability										
High	1.00	3.05*** (1.69,5.53)	1.00	3.96*** (2.07,7.59)	1.00	3.52*** (1.85,6.71)	1.00	2.79*** (1.17,6.67)	1.00	4.31** (1.44,12.90)
Lower										

***<0.001

**<0.01

*<0.05

Results - Cognitive Impact Adjusted Models



	Awareness		Comprehension		Acceptance		Intention		Action	
	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)
Walkability										
High	1.00	3.05*** (1.69,5.53)	1.00	3.96*** (2.07,7.59)	1.00	3.52*** (1.85,6.71)	1.00	2.79*** (1.17,6.67)	1.00	4.31** (1.44,12.90)
Lower	1.00	2.00*** (1.45,2.77)	1.00	2.06*** (1.47,2.90)	1.00	2.06*** (1.47,2.90)	1.00	2.16*** (1.42,3.29)	1.00	2.45** (1.37,4.38)

***<0.001

**<0.01

*<0.05

Results – Behavioral Impact Adjusted Models



	Any transport walking		Sufficient transport walking	
	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)
Walkability				
High	1.00	0.82 (0.44,1.51)	1.00	0.86 (0.48,1.56)
Lower	1.00	0.69* (0.49,0.99)	1.00	0.87 (0.62,1.22)

*<0.05

Results – Behavioral Impact Adjusted Models



	Any transport walking		Sufficient transport walking		Any overall walking		Sufficient overall walking	
	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)
Walkability								
High	1.00	0.82 (0.44,1.51)	1.00	0.86 (0.48,1.56)	1.00	0.80 (0.36,1.76)	1.00	1.56 (0.89,2.76)
Lower	1.00	0.69* (0.49,0.99)	1.00	0.87 (0.62,1.22)	1.00	0.80 (0.50,1.27)	1.00	1.17 (0.85,1.61)

*<0.05

Results – Behavioral Impact Adjusted Models



	Any transport walking		Sufficient transport walking		Any overall walking		Sufficient overall walking		Any total physical activity		Sufficient total physical activity	
	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)	Pre OR	Post OR (95%CI)
Walkability												
High	1.00	0.82 (0.44,1.51)	1.00	0.86 (0.48,1.56)	1.00	0.80 (0.36,1.76)	1.00	1.56 (0.89,2.76)	1.00	0.58 (0.21,1.62)	1.00	1.54 (0.84,2.82)
Lower	1.00	0.69* (0.49,0.99)	1.00	0.87 (0.62,1.22)	1.00	0.80 (0.50,1.27)	1.00	1.17 (0.85,1.61)	1.00	0.76 (0.43,1.34)	1.00	1.46* (1.04,2.05)

*<0.05

Conclusions



- Cognitive campaign impacts increased post-campaign as well as some behaviors
- Campaign cognitive effect sizes were larger in high vs. lower walkable group – action was double
- Neighborhood walkability appeared to moderate cognitive impacts of mass media communication strategies, but not behavior
- Residents of more walkable areas may find the scenarios advertised more relevant and attend to campaign messages

Limitations



- Physical activity measures
- Small sample size
- Cross-sectional design
- No control group

For future research:

- Walking measures – specific to the context of the particular environment you are measuring & tied to the campaign
- Sampling – designed to maximize environmental variability & sample size

For future campaigns:

- Better appeal to people in less supportive neighbourhoods or provide support in other capacities (i.e. multi-level interventions)

Acknowledgements



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Centre for the Built Environment and Health

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¹University of Sydney

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The University of Western Australia

³University of Melbourne

⁴Edith Cowan University

⁵Heart Foundation

⁶School of Sport Science, Exercise and
Health, The University of Western Australia

* Student Supervisors

^ Supported by an NHMRC Senior Research Fellowship

The Find Thirty every day[®] campaign is a Heart
Foundation initiative funded by the Department of
Health, Western Australia.

Methods – Evaluation Design

